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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,920	05/19/2006	Ken Sawabe	SOEI0021	9014
24203	7590	02/04/2008	EXAMINER	
GRIFFIN & SZIPL, PC SUITE PH-1 2300 NINTH STREET, SOUTH ARLINGTON, VA 22204			THOMPSON RUMMEL, PONDER N	
			ART UNIT	PAPER NUMBER
			1795	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/595,920

Applicant(s)

SAWABE ET AL.

ExaminerPONDER N. THOMPSON
RUMMEL**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Grubb (US 3,647,467).

With respect to claims 1, 2, and 20, Grubb discloses a photoactivatable composition comprising:

- A binder polymer (column 10, lines 51-75)
- A photopolymerizable compound with at least one ethylenically unsaturated bond (column 12, lines 29-42);
- A photopolymerization initiator such as such as a 2,4,5-triarylimidazolyl dimer (column 3, lines 66-69); and
- A heterocyclic sensitizing compound selected from: 2,5-diphenylfuran, 2,5-diphenyl-3,4-dimethylfuran, 2,5-diphenyl-3-ethylfuran, 2,5-di(p-methylphenyl)furan, 2,5-di(2,4-dimethylphenyl)furan, 2,5-di(p-butylphenyl)furan, 2,5-di(p-benzylphenyl)furan, 2-phenyl-5-(p-biphenyl)furan, 2,5-di(p-biphenyl)furan, 2-phenyl-5-(α -naphthyl)furan, 2,5-diphenyloxazole, 2,5-diphenyl-3-methyloxazole, 2,5-di(p-isopropylphenyl)oxazole, 1,4-bis(2-(5-phenyloxazolyl))benzene, 1,4-bis(2-

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(4-methyl-5-phenyloxazolyl))benzene, 2-phenyl-5-(p-biphenyl)oxazole, 2-phenyl-5-(α -naphthyl)oxazole, 2,5-di(α -naphthyl)oxazole, 1,4-bis(2-(5-phenyloxazolyl))naphthalene, 2,5-di(α -naphthyl)-1,3,4-oxadiazole, 2-phenyl-5-(α -naphthyl)-1,3,4-oxadiazole, 2,5-di(p-t-butylphenyl)-1,3,4-oxadiazole, 2,5-di(4-methyl-1-naphthyl)-1,3,4-oxadiazole, 2-phenyl-5-(p-biphenyl)-1,3,4-oxadiazole, 2-(4-biphenyl)-5-(4-t-butylphenyl)-1,3,4-oxadiazole, and 1,4-bis(2-(5-phenyl-1,3,4-oxadiazolyl))benzene (column 3, lines 31-48). These compounds meet the limitations set forth in formulas (1a), (1b), (1c) and (2) of applicant's claim.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claim 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohta et al (US 5,476,690) in view of Grubb (US 3,647,467).

With respect to claims 1-6, and 10-20 Ohta et al. discloses a process for preparing a printed circuit board that comprises a light-sensitive resin composition that comprises:

A. a high molecular weight binder having an acid value of 10 to 46 mg KOH/g (column 4, lines 5-10), a molecular weight between 20,000 and 2000,000 column 5, lines 41-46 and Synthetic Example 4 – column 10,

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lines 15-21) and in amounts of 40 to 80 parts per weight (column 6, lines 24-26) ;

B. a compound having a least two polymerizable unsaturated double bond, such as bisphenol A (column 5, lines 55-59), in amounts of 20 to 60 parts by weight (column 6, lines 26-30); and

C. a photopolymerization initiator, such as a 2,4,5-triarylimidazole dimer (column 6, lines 13-21), in amounts of 0.1 to 10 parts by weight with respect to content of A and B (column 6, lines 31-33).

Ohta et al. further discloses forming a layer of the light-sensitive resin composition of claim 1 onto a substrate (support) (column 6, lines 44-49).

However, Ohta et al. does not disclose the use of a compound of formula (1a), (1b), (1c), or (2) of applicant's claim 1.

Grubb discloses a photoactivatable composition comprising: A binder polymer (column 10, lines 51-75)

- A photopolymerizable compound with at least one ethylenically unsaturated bond (column 12, lines 29-42);
- A photopolymerization initiator such as such as a 2,4,5-triarylimidazolyl dimer (column 3, lines 66-69); and

A heterocyclic sensitizing compound selected from: 2,5-diphenylfuran,

2,5-diphenyl-3,4-dimethylfuran, 2,5-diphenyl-3-ethylfuran, 2,5-di(p-methylphenyl)furan, 2,5-di(2,4-dimethylphenyl)furan, 2,5-di(p-butylphenyl)furan, 2,5-di(p-benzylphenyl)furan, 2-phenyl-5-(p-biphenyl)furan, 2,5-di(p-

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biphenyl)furan, 2-phenyl-5-(α -naphthyl)furan, 2,5-diphenyloxazole, 2,5-diphenyl-3-methyloxazole, 2,5-di(p-isopropylphenyl)oxazole, 1,4-bis(2-(5-phenyloxazolyl))benzene, 1,4-bis(2-(4-methyl-5-phenyloxazolyl))benzene, 2-phenyl-5-(p-biphenyl)oxazole, 2-phenyl-5-(α -naphthyl)oxazole, 2,5-di(α -naphthyl)oxazole, 1,4-bis(2-(5-phenyloxazolyl))naphthalene, 2,5-di(α -naphthyl)-1,3,4-oxadiazole, 2-phenyl-5-(α -naphthyl)-1,3,4-oxadiazole, 2,5-di(p-t-butylphenyl)-1,3,4-oxadiazole, 2,5-di(4-methyl-1-naphthyl)-1,3,4-oxadiazole, 2-phenyl-5-(p-biphenyl)-1,3,4-oxadiazole, 2-(4-biphenyl)-5-(4-t-butylphenyl)-1,3,4-oxadiazole, and 1,4-bis(2-(5-phenyl-1,3,4-oxadiazolyl))benzene (column 3, lines 31-48). These heterocyclic compounds are used with the initiator to absorb at wavelengths that are not absorbed by the initiator (column 2, lines 17-20). The heterocyclic compounds are useful as light actuated photooxidants and which can significantly increase the compositions total absorption of usable light during exposure (column 3, lines 57-64) and further provide better optical quality and imaging speed than commercial radiation sources (column 1, lines 44-54).

Therefore, It would have been obvious to one of ordinary skill within the art at the time of the invention to include the uses of a heterocyclic compound as disclosed by Grubb within the light sensitive resin composition of Ohta et al. to improve optical quality, light absorption and imaging speed.

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With respect to claims 6 and 16-19, Ohta et al. further discloses forming a layer of the light-sensitive resin composition of claim 1 onto a substrate (support) (column 6, lines 44-49).

With respect to claim 7, Ohta et al discloses a method of forming a negative pattern comprising:

- A. laminating a light-sensitive element that consist of a layer of the light-sensitive resin composition onto the surface of the substrate (column 7, lines 1-3);
- B. imagewise irradiating the light sensitive composition with active light (column 7, lines 16-26); and
- C. developing the substrate (column 7, lines 55-57)

With respect to claim 8, Ohta et al further discloses a process for preparing a printed circuit board by electroless copper plating by using the negative pattern of the light-sensitive resin composition (column 8, lines 11-18) as formed in claim 7.

Response to Arguments

2. Applicant's arguments, see page 8, filed November 26, 2007, with respect to the rejection(s) of claim(s) 1- 19 under 35 U.S.C. 102 (e) and claims 1-19 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is

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made in view of Grubb (US 3,647,467). Grubb discloses the composition of amended claim 1 which further includes the entire list of component (D) compounds that are disclosed in applicant's newly added claim 20.

3. Additional, Grubbs in view of Ohta et al (5,746,690) discloses the composition as well as the method of processing a circuit board (column 8m line 11-18). Grubbs further discloses each of the compounds used for component (D) within applicant's claim 20.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **PONDER N. THOMPSON RUMMEL** whose telephone

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number is (571)272-9816. The examiner can normally be reached on Monday-Friday 7:00 am - 4:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/P. N. T./
Examiner, Art Unit 1795

CYNTHIA H. KELLY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

